BLOG.

With the Author's Compliments.

# Sir James Young Simpson

AND THE

# Discovery of Chloroform

*By*

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# Sir James Young Simpson and the Discovery of Chloroform*

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Chloroform may not be the popular anæsthetic that it once was. It may even be obsolescent. But it will always hold an important place in the pharmacopœia and the story of the discovery of its anæsthetic properties will remain one of the romances of medicine.

It might seem to be an inopportune moment to introduce this matter when the drug is losing much of its popularity, but as an Edinburgh man I would wish that from time to time the profession at large should hear of the remarkable man who made the discovery, and of the dangers and travail connected with the search.

Let me add that I assume the role of remembrancer with considerable diffidence although I may perhaps be regarded as more suitable than most for the task seeing I am the grandson of the man who, just as Stanley unearthed Livingstone in the middle of Africa, discovered the discoverer of chloroform under the tablecloth in the dining-room of 52 Queen Street on the 4th November, 1847.

By way of a background for my subject let me say something of the teachers in the Faculty of Medicine in the Edinburgh of the middle of last century, the men who were Simpson's colleagues and who, some of them, assisted in the research.

Anatomy was represented by John Goodsir. As is stated in Sir William Turner's life, "Goodsir had a world-wide reputation as the most philosophical anatomist of the century."

Physiology, or Institutes of Medicine, as it was then called, is represented in the group by John Hughes Bennett. At the time of the discovery of chloroform he was only extra-mural lecturer in his subject, but within a few months he became professor. He was pathologist and clinician as well as professor of Physiology. He was an indefatigable worker and very thorough. In his capacity as pathologist to the Royal Infirmary he was accustomed to scoff at the lack of enthusiasm

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displayed by his clinical colleagues who posted out of the autopsy room as soon as the main pathological condition had been found without waiting for the full investigation of the subject. He introduced codliver oil to the notice of the profession in Britain and he was the first to use it in the treatment of phthisis. He was the first to describe the disease which is now called leukæmia, which Bennett named leucocythæmia, a more correct term than that given later by Virchow, inasmuch as it means leucocyte—containing blood while leukæmia signifies white blood. Byrom Bramwell states that Bennett was the man who gave the knockout blow to bleeding in the practice of medicine.

John Hutton Balfour was professor of Botany. He was commonly known amongst the students as "Woodyfibre."

Lyon Playfair, afterwards Lord Playfair, was professor of Chemistry. He saved Sir James Simpson's life on one occasion. The latter, always on the search for fresh anæsthetics, heard of a new compound and came to the chemistry laboratory for a sample. He wanted to inhale the liquid there and then, but Playfair insisted upon trying it upon two rabbits first. These animals speedily died under its influence and Simpson was saved.

Robert Christison was professor of *Materia Medica,* a striking figure in a remarkable group. He became professor of Medical Jurisprudence at the early age of twenty-five, but ten years later he took over the teaching of *Materia Medica.* He has left a name which will always be remembered in *Materia Medica* and Pharmacology.

The teaching of Surgery was in the hand of James Miller, who is still remembered by some of the older men in the profession on account of his text-book of Surgery long used on both sides of the Atlantic.

Clinical Surgery was taught by James Syme, whose reputation rivalled that of Simpson. He was a very great surgeon, but his antagonism to Simpson was notorious. A famous clash between the two occurred over the question of "acupressure" on which Simpson had written a brochure of over 600 pages. Syme on meeting his class tore the pamphlet into pieces before them. The students expected a scene in the midwifery class next day, but the professor on entering the classroom merely said with his genial smile: "Gentlemen, torn arteries don't bleed," and went on with his lecture.

Medicine was represented by Alison, elder brother of Sir Archibald Alison, the historian, Natural History by Jameson, Pathology by William Henderson and Medical Jurisprudence by Traill.

Turning to the professor of Midwifery—the subject of this address—James Young Simpson, came of humble birth. His success in life illustrates well the "lad o' pairts" from the humble Scottish home. He was born in the little town of Bathgate, eighteen miles west of Edinburgh, on June 7th, 1811. He was the seventh son of the local baker. His forebears were of sturdy laboring farmer stock. On his mother's side he came of Huguenot extraction. The French element was mixed with a gentle strain which could be traced back to William Wallace through the Clelands of Cleland. In monetary straits at the time of the birth of James, the Bathgate baker from that time onwards prospered.

As a schoolboy, James was known to the neighborhood as the "wise wean" and so it was that the family decided that he was the one who was to have the advantages of a university education, the whole family, brothers and father alike, investing their savings in this way. At the early age of fourteen, Simpson entered as an Arts student at Edinburgh University. "Very, very young and very solitary, very poor and almost friendless, I came to settle down in Edinburgh and fight amongst you a hard and uphill battle of life for bread, and name and fame." So said Sir James to his fellow-citizens, forty years later on the occasion of receiving the Freedom of the City of Edinburgh.

It was through living in the same rooms as two other Bathgate boys—Reid and McArthur—both of them medical students, that he was led to take up medicine. Intended at first for the Church (like William Osler), this association with medical talk and medical books was too much for the young student. While an Arts student he attended the anatomy lectures of the famous Dr. Knox, of Burke and Hare fame, in Surgeon's Hall. He began his medical studies in 1827 at the age of sixteen. Qualifying at nineteen, he took his degree at twenty-one, the earliest possible age legally. In the interval between qualifying and taking his degree he attended post-graduate lectures in Edinburgh and became assistant to the professor of Pathology—Dr. Thomson—at the magnificent salary of fifty pounds a year. It was through the advice of Professor Thomson that he decided to take up practice in Edinburgh and to specialize in obstetrics.

Aided by funds from two of his brothers he travelled abroad for some time and then settled down to practice in the northern part of Edinburgh. In 1835 he was elected senior president of the Royal Medical Society, a student organization which has done much for Edinburgh. His dissertation as president was entitled the "Pathology of the Placenta." This work is still a classic.

Then followed a busy time in general practice, for the fame of the young doctor soon spread and at the early age of twenty-nine he assumed the duties of professor of Midwifery, following Dr. Hamilton after an election contest of unusual bitterness. Two objections were raised to his appointment—his extreme youth and his unmarried state. Within a few days of the election he took steps to right the latter objection. He was elected professor by a majority of one vote.

A word or two might be said of his appearance and characteristics. He looked short (this was largely due to his breadth), but he was strongly built. He had a very large head and a thick mane of auburn hair. "The head of Jove and the body of Bacchus" as was commonly said. In repose he had a somewhat melancholy expression, says his daughter, but as we see him in his portraits he is quite remarkably genial looking. His general appearance was arresting. The late duke of Argyl said of him, "I do not know that I ever met any man in whom genius was written more in face and voice and manner."

One of his outstanding characteristics was his extraordinary industry, and he utilized every moment of his time. "How do you get time," asked a patient, "to read all the novels of the day." "By never wasting an orra moment," was the professor's reply.

He possessed the unusual advantages of being able to do with little sleep. He slept readily under the most disadvantageous circumstances and awoke refreshed after even ten minutes slumber. He had no recreations. In his latter days when tired of practice and city surroundings he was accustomed to drive down to a home he had in Trinity, some three miles from his town house, where he enjoyed as he was accustomed to put it, "a sunset and a boiled egg." He was extraordinarily busy in his practice and would drive in his carriage at a great rate —almost a hand gallop, the police having special instructions regarding him. A good story is told of him in this connection. He was driving into town from Liberton one morning when his horses ran away. They were pulled up in Nicholson Street by a dray drawn across the roadway. The usual crowd rapidly collected and the professor, putting his head out of the window, shouted, "Do go on, please. I'll be late for my lecture." His coachman, a grim, bad tempered, but devoted servant, turned sadly to the crowd and said. "Ech, Sirs, but it's an awfu' thing drivin' a man that dis'na ken he's been rin awa' wi', and me nearly killed."

He was an extraordinary lovable man and his patients, of course, adored him, but he was keen in controversy and engaged in more than one contest with colleague or opponent. These

quarrels, notably those with Syme and Joseph Lister, have, perhaps, been given undue prominence. The quarrel with Lister over the antiseptic method was particularly unfortunate and it arose rather from his keen advocacy of "acupressure" than from an antagonism to antiseptics. In this controversy, which is dealt with in Lister's life by Godlee, he persisted in ignoring the main point at issue and concentrating upon the minor point of priority in the use of carbolic acid in the treatment of wounds.

He was a man of encyclopædic knowledge and as is well known, like Rudolf Virchow, he wrote voluminously on archæology as well as on medical subjects. John Brown, author of "Rab and His Friends," watching him leaving his publishers wrapped in his famous sealskin coat remarked, "There is not one man, there are many men under that coat." A medical man writing in an Indian paper in 1848 says, "Decidedly the most wonderful man of the age in which he lives is Simpson, of Edinburgh."

Byrom Bramwell in his reminiscences makes the statement that in his opinion Simpson was "the greatest, by far the greatest" of his teachers. And remember that Syme was one of Bramwell's teachers. Bramwell continues, "To my mind the guiding principle of Simpson's life and work was to find out and employ methods and means of relieving human suffering and of saving and prolonging life. He was always trying to find out something new; he was constantly trying new drugs."

Here is an extract from a letter to one of his brothers on the occasion of his appointment as one of Queen Victoria's physicians. "Flattery from the Queen is perhaps not common flattery, but I am far less interested in it than in having delivered a woman this week without any pain while inhaling sulphuric ether. I can think of naught else." The relief of pain was indeed his chief aim and even before he turned his attention to drugs he tried his hand at hypnotism. In 1846 there came the news of the first trial of ether in surgery. No one hailed it more heartily than Simpson. He was, moreover, as just stated, the first obstetrician to use it in his practice. Morton and Simpson corresponded, but the latter, for reasons which appear below, was not satisfied and continued his observation on volatile drugs. As already stated he was far from judicious in his attempts to produce unconsciousness on himself and his assistants. It is remarkable that no serious accident occurred. He explains his object thus: "Latterly in order to avoid if possible some of the inconveniences pertaining to sulphuric ether, particularly its disagreeable and persistent smell, its occasional tendency to irritation of the bronchi during its first inspira-

tions, and the large quantity of it required to be used (more especially in protracted cases of labor), I have tried upon myself and others the inhalation of different volatile fluids, with the hope that some one of them might be found to possess the advantages of ether without its disadvantages. For this purpose I have selected for experiment and have inhaled several chemical liquids, of a more fragrant or agreeable odor, such as chloride of hydrocarbon, etc. Then Mr. Waldie, a Linlithgowshire man, first named perchloride of formyle (chloroform), as worthy among others of a trial." His assistants in this dangerous research were Drs. George Keith and Matthews Duncan, both of whom became distinquished obstetricians and gynæcologists. Dr. Keith practised in Edinburgh for many years and was a pioneer in gynæcological surgery. Dr. Matthews Duncan on his failure to secure the chair of Midwifery after Simpson's death removed to London and practised there as an obstetrician.

### Discovery of Chloroform

Here is the description of the actual discovery given by his colleague and neighbor, Professor James Miller, in an appendix to Miller's "Principles of Surgery," 1852, American edition, edited by Sargent, of Philadelphia.

Professor Miller was accustomed to call in from time to time to see how the experiments were progressing. The account is quoted by Sir James Simpson's daughter in her life of her father, and by Sir Alexander Simpson in the Simpson Memorial number of the *Edinburgh Medical Journal,* 1911.

Professor Miller says: "The ordinary method of experimenting was as follows: Each 'operator' having been provided with a tumbler, finger glass, saucer or some such vessel, about a teaspoonful of the respirable substance was put in the bottom of it; and this again was placed in hot water, if the substance happened to be not very volatile. Holding the mouth and nostrils over the vessel's orifice inhalation was proceeded with, slowly and deliberately; all inhaling at the same time, and each noting the effects as they advanced.

"Most of these experiments were performed after the long day's toil was over—at late night, or early morn; and when the greater part of mankind were soundly anæsthetized in the arms of common sleep. Late one evening—it was the 4th November, 1847—on returning home after a weary day's labor, Dr. Simpson, with his two friends and assistants, Drs. Keith and Matthews Duncan, sat down to their somewhat hazardous work, in Dr. Simpson's dining-room. Having inhaled several substances, but without much effect, it occurred to Dr. Simpson to

try a ponderous material which he had formerly set aside on a lumber-table and which, on account of its great weight, he had hitherto regarded as of no likelihood whatever. That happened to be a small bottle of chloroform. It was searched for, and recovered from beneath a heap of waste paper. And, with each tumbler newly charged, the inhalers resumed their vocation. Immediately an unwonted hilarity seized the party; they became bright-eyed, very happy and very loquacious, expatiating on the delicious aroma of the new fluid. The conversation was of unusual intelligence, and quite charmed the listeners—some ladies of the family and a naval officer, brother-in-law of Dr. Simpson. But suddenly there was a talk of sounds being heard like those of a cottonmill, louder and louder; a moment more, then all was quiet; and then—a crash. On awakening, Dr. Simpson's first perception was mental—"This is far stronger and better than ether," said he to himself. His second was, to note that he was prostrate on the floor, and that among the friends about him there was both confusion and alarm. Hearing a noise, he turned round and saw—Dr. Duncan beneath a chair; his jaw dropped, his eyes staring, his head bent half under him; quite unconscious, and snoring in a most determined manner. More noise still, and much motion. And then his eyes overtook Dr. Keith's feet and legs, making valorous efforts to overturn the supper-table, or more probably to annihilate everything that was on it; I say, more probably; for frequent repetitions of inhalation have confirmed, in the case of my esteemed friend, a character for maniacal and unrestrainable destructiveness—always under cloroform in the transition stage.

"By and by, Dr. Simpson, having regained his seat, Dr. Duncan having finished his uncomfortable and unrefreshing slumber, and Dr. Keith having come to an arrangement with the table and its contents, the sederunt was resumed. Each expressed himself delighted with this new agent, and its inhalation was repeated many times that night, one of the ladies gallantly taking her place and turn at the table—until the supply of chloroform was fairly exhausted. In none of these subsequent inhalations, however, was the experiment pushed to unconsciousness. The first event had quite satisfied them of the agent's full power in that way. Afterwards, they held their wits entire, and noted the minor effects on themselves and each other. Though the specimen of chloroform was by no means pure, yet they found it was much more agreeable and satisfactory in every way, than anything else which they had formerly tried, and it required no vote of the party to determine that at length something had been found, 'Better than ether.' The

festivities of the evening did not terminate till a late hour—3 a.m. The latter part of the time, however, had not been devoted to inhalation.

"The small stock of chloroform having been speedily exhausted, research was busy, among chemical authorities, to find the best formula for making more. The formula was found; the same morning, Mr. Hunter, of Duncan, Flockhart and Co., was pressed into the service of restoring the supply; and from that day and hour there was, for many months, no respite for that gentleman. Working with an ordinary retort, he could not make chloroform fast enough for the consumption of Dr. Simpson and his friends in their professional practice; and relief came only with a better mode and larger scale of production.

### First Operation Under Chloroform.

"Satisfied by the first experiments, of the safety and suitableness of the agent," Professor Miller continues, "Dr. Simpson lost no opportunity of extending its application. And one day, early in November, I had myself the privilege of witnessing a striking example of its success. Dr. Simpson having not yet had an opportunity of trying it in surgery, came over to the hospital in search of one. It so happened that three minor operations stood for the day, two by myself, the other by Dr. Duncan. My patient, a Highland boy, four or five years old, affected with necrosis of the radius, came first. He knew no tongue but the Gaelic, and it was, of course, out of our power to explain to him what he was required to do. On holding a handkerchief on which some chloroform had been sprinkled, to his face, he became frightened and wrestled to be away. He was held gently, however, by Dr. Simpson, and obliged to inhale. After a few inspirations, he ceased to cry or move, and fell into a sound snoring sleep. A deep incision was now made down to the diseased bone and by means of forceps nearly the whole of the radius, in a state of sequestrum, was extracted. During this operation, and subsequent examination of the wound by the finger, not the slightest evidence of the suffering of pain was given. He still slept on soundly, and was carried back to his ward in that state. Half an hour afterward he was found in bed, like a child newly awakened from a refreshing sleep, with a clear, merry eye, and placid expression of countenance, wholly unlike what is found to obtain after etherization. On being questioned, by a Gaelic interpreter who was found among the students, he said he never had felt any pain, and that he felt none now. On being shown his wounded arm he expressed much surprise; but neither cried nor otherwise expressed the slightest alarm."

Simpson's method of administering chloroform was the open method. He gave the drug freely, put the patient well under so as to abolish reflexes and made the state of the respiration the guide to the safety of the patient. The above-mentioned opinions of Simpson and his colleagues regarding the relative value of chloroform and ether have, it is unnecessary to say, not been born out by experience. Still chloroform for long took the first place among anæsthetics in certain schools.

Simpson made many other important contributions to pharmacology, to obstetrics and to medicine in general. Although he had marvellous skill as an obstetrician he never was a great surgeon and he was too old to absorb the teaching of Lister. He himself laid great stress upon his discovery of a method of controlling bleeding in surgical operations by means of acupressure. His notion was to get rid of the sloughing which followed the use of the ligature and which often resulted in secondary hæmorrhage. He was greatly disappointed that the method was not generally adopted. He was intensely interested in and wrote largely on the question of hospitals, and he was an advocate of isolated single-storied buildings, instead of the large blocks of wards, one above the other, which could easily be pulled down and which permitted of isolation of septic cases. His notion was to have more air space and so assist nature in her process of repair. In this as in many other respects he was far ahead of his time. As Bramwell tells us, he actually foresaw the discovery of X-rays in the sixties of last century.

He died on May 6th, 1870, at the age of fifty-nine, worn out with incessant hard work. Bryom Bramwell gives the following account of the post-mortem examination. "The organs all showed a marked degree of fatty degeneration. There was an aneurism of the heart the size of a pigeon's egg. The great vessels at the base of the brain were atheromatous and much dilated. The internal carotids and basilars were two or three times the normal size (I have always wondered whether this was entirely the result of disease, or whether owing to the large demands which Simpson's very active brain made on the circulation, the large arteries at the base of the brain may not have been physiologically wider than the normal). The convolutions of the cerebrum were remarkable for their number, depth and the intricate nature of their foldings. They were packed and twisted on each other in such a manner that many were dwarfed and failed to reach the surface. The plethora of grey matter occasioned by this arrangement was most evident in the anterior lobes and islands of Reil."

His funeral was probably the second largest which Edinburgh has ever seen, the largest being Sir Walter Scott's. For

his body a resting place was offered in Westminster Abbey, but his wife preferred that he should lie in Scottish soil. So he rests in Warrister Cemetery, his headstone looking up towards the city in which he labored, crowned by the castle rock.

James Young Simpson's life is a lesson in indefatigable industry. Moreover his researches demonstrate that the highest type of pioneering medicine can be done by the general practitioner. Because after all that is what Simpson was. By far the largest part of his practice was general work and obstetrics. Of course, an even more striking example of what the ordinary practising doctor can do in the way of first-class research is to be found in another Edinburgh man who has recently passed over. Sir James MacKenzie's constant teaching was that first-class work can be done by any one who has vision, courage, and industry. We are still too apt to think that nothing can be effected without the latest and most expensive apparatus and palatial laboratories, and to leave it at that. Let us remember that Simpson's stock in trade was character, a tumbler and his own dining-room.